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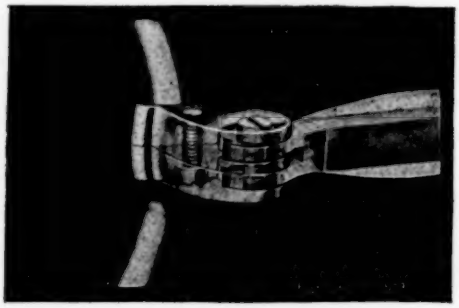

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3. Why is it that Twintex may be imitated, but cannot be duplicated?

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4. For what, besides Christmas, is December 25, 1923, noted?

   *It is the date on which the Twintex patents were granted.*

5. If it isn't marked————, it isn't Twintex; it may be an imitation, it can't be a duplication. Look for the ———— name, stamped around the screw hole in the butt of every Twintex temple. With what famous word would you fill in the two blanks above?

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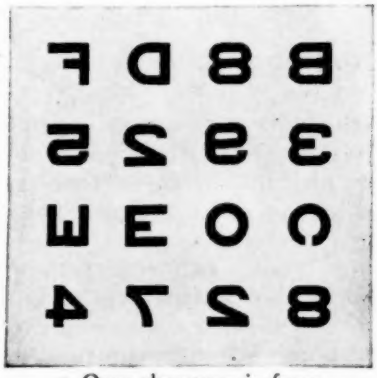

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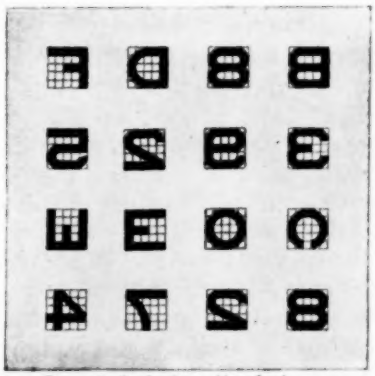

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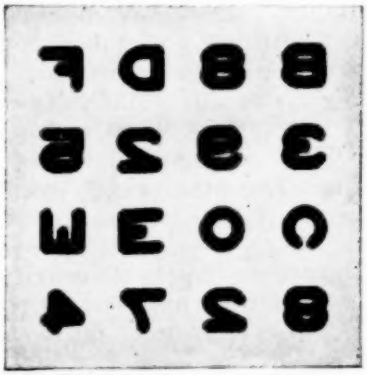

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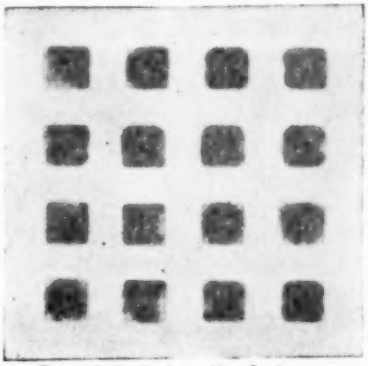

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# THE AUTOMATICITY OF OCULAR CONTROL VIA MYOCULATOR TRAINING

Carl F. Shepard, D. O. S.

Chicago, Ill.

Optometry is indebted to Prof. H. L. Fuog of Los Angeles for opening an entirely new field of optometric service to the eyes of humanity. His eight and one-half years of painstaking optometric research and infinite patience produced the myoculator, which is comparable to the cyanide process of refining gold in that both enable man to wrest from nature invaluable materials (metal on the one hand—mental on the other) which turned to his own uses and service vastly increase the comfort, power and prosperity of civilization. For, inasmuch as 80 per cent of all that man gains from the world is gained through vision, surely the improvement of human sight and visual efficiency is an enormous addition to public wealth.

We see with the mind through the eye and, in turn, control and direct the eye from the mind. Light from an object in space is focused from the retina and from the rods and cones thus stimulated impulses travel along the optic nerve fibres to the brain. The intensity of the impulses delivered to the brain depend upon the intensity of the stimulation and the efficiency of the nerve fibres. The efficiency of nerve fibres in the normal person depends upon the frequency of their use. Each time a nerve fibre conveys an impulse, it becomes more proficient in the act.

Within the brain, several of the nine billion neurons are in constant readiness to relay impulses from the optic nerve to the several visual centers. How many of these neurons will be affected depends upon the intensity of the impulse delivered by the optic nerve. Which of these neurons will be the first to relay the message depends upon the nature of the impulse and previous experience with similar impulses. Arriving at the visual centers, these impulses are translated into conception of light, motion, color, form, etc., so that the mind conceives the nature of the object in space.

If the nature of an object in space is relatively unimportant as compared to other objects being reported to the mind at the same instant, the individual may never become "conscious" of having "seen" the object in question, but if its properties are such that the mind considers it worthy of further examination and investigation, impulses travel from the visual centers to the motor centers, from which stimulation is directed to the various muscles of the eye or body and the investigation proceeds.

Even up to this point the person remains completely "unconscious" or at most "subconscious" of the entire proceeding. The often vastly complicated series of muscular adjustments required being performed instinctively with machine-like automaticity. Thus it is that while you have been reading these lines your eyes have not only been making at least five highly complicated adjustments each second in picturing the printed words within your brain, but they have found time to investigate perhaps a hundred other objects within their field; but with all that activity going on, your consciousness has not once been disturbed, but has, like any other efficient executive, been left free to wrestle with the more important, though less tangible, problems of "meaning" and "values."

Ocular control is normally at least 98 per cent automatic. In fact, the only normal occasion for conscious control of normal eyes is the voluntary "rolling" of the eyes about without attempting to "see" anything in particular. A personal experimental exercise of this ability will demonstrate convincingly that conscious ocular control is immeasurably more awkward, more tiresome and infinitely less efficient than automatic ocular control.

Consciousness of ocular control is awakened by abnormal conditions known as heterophoria and heterotropia. To define heterophoria as an imperfection of instinctive, automatic fixation would be to invite discussion; but to so consider heterophoria enables one to grasp its significance with greater ease, and to accomplish its correction with greater facility; for if each eye instinctively, automatically and perfectly "fixes" the object of regard, each retinal image of that object will be placed upon the maculae without necessity for the awkward, fatiguing visual consciousness of the "fusion" or "duction" effort. Furthermore, myoculator training has demonstrated repeatedly and conclusively that perfect development of automatic fixation eliminates every evidence of heterophoria and heterotropia. These conditions are not merely "overcome," they simply cease to exist. But as long as these conditions are permitted to remain, the individual will suffer discomfort, annoyance, fatigue and inefficiency rather than enjoy smooth, comfortable, automatic efficiency in the use of his eye.

The practice of developing conscious ocular control through awakening consciousness of diplopia is but an emergency measure countenanced only so long as more efficient means are nonavailable.

The "duction" powers are obviously never required of normal eyes under normal circumstances save only the four to six prism diopters of adduction normally used to supplant convergence in fixing a near point; and it is significant that the one "duction" power ever required of normal eyes under normal circumstances is the easiest to develop.

The development of abduction, for example, to offset esophoria is but the development of inefficient conscious ocular control to offset the abnormality of automatic ocular control. The only hope of ultimate comfort and visual efficiency through such practice lies in the possibility that in time the laborious corrective effort guided by visual consciousness may result in an improvement of automatic ocular control. By far the more successful practice is the application of means for directly correcting the automaticity of ocular control.

The very foundation of automatic ocular control will be found in an analysis of the most primitive of ocular instincts, namely, indistinctive fixation of a conspicuous moving object.

The human retina is highly specialized—the peripheral areas being most sensitive to motion and color, while the macula area most accurately reports the details of form, and direction. When the nature of any image pictured upon the peripheral area of the retina is such that the mind considers it worthy of further investigation, the automatic reaction of ocular muscles so adjusts the eye that the image falls upon the macula. This act is called "fixation" and should be instinctive in every eye. If, when pictured upon the macula, the image is disclosed as devoid of danger, or of no interest to the mind, the eye resumes its former position and consciousness is never awakened. If, on the other hand, the nature of the image is such that the most primitive instinct of living creatures, self-preservation, is awakened, the entire body may become involved in a very complicated series of reflex actions—all directed toward the protection of the body from threatened danger.

Self-preservation is the first law of nature, and that object which is dangerous is sure to be in motion. Therefore, the most deep-seated and instinctive reaction of ocular muscles is the prompt fixation and investigation of moving objects. It is undoubtedly for this reason that a moving light in a darkened room is an irresistible fascination for the human eye.

The correction of imperfect ocular co-ordination is in the nature of instruction. In other words, in correcting heterophoria or heterotropia, we are but teaching the eyes to maintain a proper relationship to each other. It has long been recognized in many branches of physical training and development that rhythmic repetition of the desired act leads most quickly to the automatic performance of the act. Not only are setting-up exercises best performed to music, but the automatic function most familiar to everyone—the act of walking—is made more easy and less tiresome if accompanied by the rhythm of the march. It has been found that even typists improve their touch and speed when typing in time to a

rhythmic tune. It is, therefore, not surprising to find that rhythmic ocular movements are the most effective exercise, most rapidly correcting imperfect ocular co-ordination and most effectually training the eyes to function perfectly and with efficient automaticity.

The phenomenal efficiency of myoculator training is directly traceable to the fundamental principles of rhythmic stimulation, and the irresistible fascination of a moving light in a darkened room. The eyes are led, not driven, through the various rhythmic movements selected by the optometrist as the most desirable calisthenics for the particular case at hand. Conscious effort to follow the moving target is seldom required. The eyes of a baby in arms may be trained as easily, in fact, more easily than the eyes of an older person, because the infant's instinctive reaction to stimulation is not interfered with by consciousness of something to be accomplished—but regardless of the age of the patient, the irresistible fascination of the rhythmically moving light is sufficiently powerful to bring about automatic fixation, and perfection of automaticity of ocular control.

Each pair of eyes has laws unto itself. It would, therefore, be impossible to anticipate the pattern of movement or the rhythm, or the multitude of details to be employed in the development of a given case. Each case must be studied carefully during the first exercises. Neither is it possible within the scope of this short article to describe the almost unlimited facilities for ocular training placed in the hands of the intelligent optometrist with the acquisition of the myoculator. An entirely new and undeveloped field for optometric service to humanity is opening for the profession, and volumes will be written as the exploration of this field goes forward. Hundreds of optometrists are contributing to the instruction and information on the subject that will soon be available.

Reports are already being made by men in ordinary practice which assure that myoculator training is destined to be optometry's greatest contribution to the comfort and efficiency of the eyes of humanity, and a contribution of such magnitude that the profession of optometry will be preeminent in the field of ocular service.

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# DIATHERMIC TREATMENTS FOR CATARACT

**G. L. DuPlessis, Opt. D.**

**Portland, Oregon.**

Much has been said concerning the non-certain therapeutic or alleviating properties of colored lenses and other agencies in the abortion of cataract. Very little has been published concerning the possible use of diathermia for this same purpose. Bordier, who is generally acknowledged in Western Europe to be an authority on the subject of diathermia and one of the first preponents of its use devotes a paragraph on its use in Cataract, in his book: "Diathermia et Diathermotherapie," 3rd Edition, J. B. Baillieres et Fils, Paris. This paragraph is here translated somewhat freely.

"Diathermia can be of great advantage in crystalline opacities particularly in cases where extraction is undesirable. From what has been done so far it seems that diathermia is to be reserved to cases of uncertain health and of no vision. In fact, in a case possessing good visual acuity of the non-cataractous eye, surgical interference is to be preferred, in all other cases diathermia is justified especially when the cataract is slow to ripen. We must also remember that diathermic treatments are painless, devoid of risks to the patient and can be continued as long as is desired. We therefore believe ophthalmologists should try this method when extraction is contra-indicated or non-essential."

The first use of diathermia in cataract, apparently should be credited to C. E. Shelly (Archives of Radiology and Electro-therapy, Nov., 1922). He proceeds on the assumption that "high

frequency oscillations being propagated in the tissues due to ions whose orientation and movements are constantly modified by passage of the current, must produce a sort of molecular massage, stirring cells and clearing them of waste products, which are replaced by new and healthy material." We can also mention the hyperemia and the active circulation in the parts treated as a cause of the elimination of this waste matter. However the first results obtained by diathermia are encouraging and point to a continuation of Shelly's efforts and the development of a good technic for the application of the current. For active electrode a wad of absorbent cotton imbibed with water and covered by tin of suitable size will serve the purpose, for indifferent or general electrode an auto condensation pad may be used. A liquid electrode in the form of a special eye cup may also be used and this permits the direct reading of the temperature reached from a thermometer contained in the glass. We will report two of a number of cases previously reported to show what diathermia can do in this depressing affliction.

Case 1. This female patient, age 70, had lost vision of the left eye when a child due to corneal opacities. Total cataract of the right eye since ten years, slow maturation. She could tell light from dark but could not see or count fingers, took a number of serious falls and was much depressed mentally. On August 25, 1921, we gave a ten minute treatment followed by ten minutes of violet ray. After the treatment she could see and count fingers at twelve inches and see foods in her plate. Sept. 3rd. Further improvement after a similar treatment. We also began treating the left eye on Oct. 14. On Sept. 28, the improvement is still more definite. Crystalline opacities are clearing on one side and the left cornea seems clearer. October 18, vision much improved especially mornings and evenings. Can see household objects clearly and can read large type. The improvement maintained itself.

Case 2. This patient, age 60, had a four year old cataract in the right eye and a fifteen year old one in the left. On Sept. 7, 1921, we gave a ten minute treatment followed by six minutes of violet ray. Sept. 14: She can see household objects and does not collide with or tip things as she used to. Oct. 22, can see colors at a greater distance, and needs no cane to follow the edge of the walk. Sees persons more distinctly. The opacities are less marked in both eyes. Nov. 5, can mend stockings, vision much improved especially in subdued light. The marginal regions of the lens are cleared up. Dec. 23, she can write. On April 26, 1923, vision was much improved, she could read her daily papers, could recognize people at 90 feet and the opacities were much reduced. Sept. 26, she could thread a needle.

The importance of the results secured in these two cases should incite ophthalmologists to systematically treat their patients in all cases where diathermia would appear to be the treatment of choice over surgical intervention. The increase in visual acuity is what is needed and desired by the patient."

Unhappily, Bordier does not give the dosage of treatment, but apparently it must be of weak intensity, probably about 200 M. A. and repeated once a week or other regular interval. The results achieved though not given in terms of visual acuity standards are undoubtedly valuable. From light and dark perception to a vision sufficient to proceed with household duties is more than many operative cases have received and this in non-operative cases. Notice that an improvement is found in the corneal opacities also and the latter type derives still less certain benefits from the knife than cataract. Diathermia constitutes a clean, harmless method of treatment and if results as here reported can be secured in only a small percentage of the cases attempted, it is still worth trying.

# HOMATROPINE AND ITS USE

John C. Neill, Opt. D.

Philadelphia, Pa.

I have endeavored in writing this paper and through personal experiments to determine the answer to a question which was brought up to me at a recent meeting of the Philadelphia Academy of Optometry, namely, is Homatropine a cycloplegic or simply a mydriatic? It seems advisable to me to first of all give my reasons for feeling that an optometrist should be interested in this subject.

Apparently owing to the large inroad that optometry has been making on the average oculist's practice, the oculist in order to meet the demands of the public for a quick examination, which he was unable to give with the cycloplegic atropine, as it required from four to six days for this drug to wear off, has of late years been resorting to Homatropine. Now, then, if there is reason for us to believe that Homatropine is not a cycloplegic would we not be justified in making the statement to those patients who are dubious of our method that the oculist is simply kidding himself by using Homatropine or he is simply using it for a psychological effect on the patient.

In trying to answer the question is Homatropine a cycloplegic, I first of all consulted a number of text books and found that the authors were at variance as to the answer, so that you may have some idea of this I will read several extractions from these books. The first book which I consulted was one on Materia Medica by Dr. Potter and gives the derivation of the various cycloplegics and mydriatics. "Belladonna or Deadly Nightshade, is an European plant containing two Alkaloids known as Atropine and the active principal and Belladonine. It also contains a coloring matter known as Atrosin and Malic Acid, Homatropine is obtained by the action of dilute Hydrocloris avid upon the Amagdalate of tropin forming Hydrobromate of Homatropine. Homatropine taken inwardly slows the action of the heart while Atropine quickens it. Both drugs stimulate the end organs of the sympathetic nerves and paralyze the motor oculi thus increasing the power of the radiating iris fibres and lessening the power of the circular iris fibres. Atropine also paralyzes the ciliary and also lessens the intra-ocular pressure." (You will note that this author says nothing about Homatropine being anything but a mydriatic.) It is also interesting to note that his statement about Atropine lessening intra-ocular pressure, a statement which has been disapproved time and time again. Some other facts which this author has given while not in keeping with the purpose of this paper, are however quite interesting and worth adding to our general knowledge of these drugs. They are, that it has been discovered that the urine of a dog which had been treated with small quantities of Atropine, being instilled in the eye of another dog will cause his pupils to enlarge and upon continued instillations, will relax the accommodation. It has also been shown that as little as 1/700,000 of a grain of Atropine will affect the size of a human pupil. These facts will give some idea of the tremendous potency of these drugs.

Dr. Thorington in his text book on methods of refraction, states "one drop of Homatropine instilled in a healthy eye will produce mydriasis in a few minutes, but its action on the ciliary muscle is so trifling that the near point will be but slightly changed." It is thus shown that this drug is a decided mydriatic and becomes a cycloplegic only upon continued use. In order to produce a definite cycloplegia with Homatropine it should be used in a strength of 1 gr. to 40M of Aq. Dist. placing one drop in each eye every hour for four hours before coming to the office for refraction, when the patient arrives one drop is instilled in each eye every five minutes for six drops, then after waiting thirty minutes the ciliary will be relaxed. The action of Homatropine may be quickened by the addition of Cocaine; this is liable, however, to cloud over the cornea, causing the visual acuity to be lowered. Homatropine may be used very successfully in a person over

thirty as the ciliary is not quite so strong as in a younger person. (It can be seen from these statements that Thorington believes in Homatropine when definitely instilled.)

Dr. Schweinitz in his text book on Diseases of the Eye states: "Homatropine has only a transitory effect on the ciliary, full accommodation on returning in about fifty hours. Some writers claim, however, that Homatropine is an insufficient cycloplegic but I have found that if care is used it usually works satisfactorily."

Tscherning in his works on Physiological Optics states: "Homatropine dilates the pupil but usually has very little effect on the ciliary. Other observers maintain to the contrary, however, this is probably due to the fact that their solution was impure." Alger in his work "Refraction and Motility" of the eye states: "I have expressed a decided mistrust for Homatropine as it is commonly used, but if it is used freely enough a satisfactory cycloplegic wil result. It should be used in a two to four per cent solution one drop in each eye every five minutes for six drops then wait one-half hour for a complete cycloplegia."

After reading and studying over the statements by these various eminent ophthalmologists as just quoted, I was really just as uncertain as to whether Homatropine was a cycloplegic as I had been before and it was then that I decided to try and find out for myself by experiments. On the seventh of February, 1927, I secured a four per cent solution of Homatropine, measured the size of the pupil and found it to be approximately six millimeters in diameter in each eye and then placed one drop of the solution in the external canthii of each eye carefully holding the tear canal closed with my fingers, waiting ten minutes before instilling another drop. After the second drop had been instilled and just before the time for the third drop, I measured the pupils and found the pupil of my right eye measured 9mm. While the pupil of my left eye was still the normal size of six mm. After the fourth drop and just before the time for the fifth, I found the pupil in the right eye was still considerably larger than in the left while my visual acuity which is normally 20/20 without correction was now 20/40 in the right eye and 20/30 in the left, with the pin hole disc it was increased to 20/30 in the right and 20/20 in the left. I decided that the difference in the two eyes was caused by the right receiving more of the drug than the left so for the next two drops I placed two drops in the left to every one in the right. The symptoms experienced were a slight stinging sensation when the first few drops were instilled, after the third drop I developed a slight nausea probably due to my subconscious effort to maintain normal vision with a partially paralyzed ciliary. The most complete effect of the drug seemed to be about three quarters of an hour after the last or seventh drop, at this time the pupil of the left eye was still about 2mm. smaller than the right. The visual acuity of the right eye was 20/50 while the left was 20/40 there was practically no amplitude of accommodation it being necessary to add plus 2.50 spheres to my distance correction of O. U. plus 2.00 with a plus 1.00 cyl. at 90. in order to read clearly at fourteen inches. With the use of the pin hole disc over my distance correction I was able to read the larger type at fourteen inches. The addition of plus 2.50 spheres for reading was not satisfactory however as there appeared to be a spasm of accommodation especially in the left eye, one moment a 2.50 sphere would be necessary while a few moments later as little as a one sphere would be sufficient. The loss of accommodation persisted for about forty-eight hours. One peculiarity that I noticed while my eyes were under the Homatropine was that in looking at the clock dial at twenty feet with my normal correction there appeared to be required about one-half diopter more of plus cylinder at 90 degrees in order to make all lines appear of equal density. I do not know certainly but I imagine that this was caused by the periferial rays passing through the lens on account of the large pupil or it may have been caused by a partial paralysis of some of the fibres of the ciliary causing a distortion of the lens.

Of course, we are all familiar with the common evils of the use of cycloplegics, in fact nearly all of the writers on Ophthalmological subjects warn of the dangers of using Belladonna derivatives in any eye where there is a tendency toward Glaucoma, however, we must agree that such things as

Glaucoma, severe conjunctivitis and Belladonna poisoning are rare occurrences when the large numbers not developing these troubles are considered. To my mind some of the most important reasons for not using the drug are those which invariably occur in practically every case such as the almost total loss of two days' time because of inability to see close, a slight nausea and headache during this time, aside from these inconveniences to the patient I would state that the greatest disadvantage is the danger of ciliary spasm which it is practically impossible to eliminate with Homatropine and the danger of over correcting due to the large area of the lens exposed by the large pupil. In concluding this paper I would say that Homatropine seems to me to be a good cycloplegic, but an indifferent mydriatic particularly when necessity demands that it be instilled by the ophthalmologist himself.

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# GLAUCOMA

**A. J. Ballantyne, M. D., M. B., F. R. F. B. S.**

Being a Lecture Delivered to the Western Branch of the British Optical Association, at the Royal Technical College, Glasgow, from the

*British Journal of Physiological Optics.*

Let us, before launching into the specific subject of this lecture, remind ourselves of some elementary facts concerning the anatomy and physiology of the eye.

If we examine a diagram showing an antero-posterior section of the human eyeball, it will be seen that it is a hollow globe whose wall is, broadly, composed of three tunics or coats: (1) An outer, protective, coat made up of the sclera and cornea. (2) A middle, nourishing, coat, called the uvea, and comprising the choroid, ciliary body and iris, and (3) an inner, nervous, coat, consisting of the retina and its continuations over the inside of the ciliary body and iris. The iris is separated from the cornea by the anterior chamber and acts as a diaphragm, with a variable opening at its center—the pupil. Behind the iris lies the crystalline lens. The anterior chamber is filled with the aqueous humour, a watery fluid, while the space behind the lens is filled with the vitreous humour, a transparent substance like a colorless jelly.

I wish to draw your attention particularly to one or two parts which have a special bearing on the subject of tonight's lecture.

1. While the retina proper is concerned directly with vision, the anterior continuation of the retina, especially the part lining the ciliary body, has a different function, viz., that of secretion. It will be seen that this structure, consisting of two layers of cells, is in contact with a structure very rich in blood vessels—the ciliary body. We have here indeed the conditions found in any secreting gland, and the so-called ciliary epithelium secretes the clear fluid called the aqueous humour, which fills the anterior chamber in front of the iris, and also fills the spaces behind the iris and between it and the vitreous humour.

2. The formation or secretion of aqueous humour is supposed to be continuous, and along with this process we have another, that of filtration of aqueous humour out of the eye. This takes place through certain narrow channels at the angle where iris meets cornea—the spaces of Fontana—and from these through the circular sinus known as the Canal of Schlemm, into certain veins which pass out through the sclera to join the orbital veins. It is important to understand this, for it is the very heart of the problem of glaucoma. Imagine a bicycle or motor tire into which air is being pumped. If there is no provision for escape of air the tire will become more and more distended, and harder and harder to the feel. If one stops pumping in air and opens the valve, air will escape

and the tire will become unduly soft. But if air be pumped in while at the same time provision is made for the escape of a certain amount of air, the pressure inside the tire can be maintained at any desired level. This is what happens in the normal eye. Aqueous humour is continually being secreted, but it is also being continually removed. A balance is set up between these two processes and the intra-ocular pressure is maintained at a level which is favorable to the proper functioning of the ocular structures. If, however, the channels through which the aqueous fluid should escape are obstructed in any fashion, this balance is upset, aqueous fluid accumulates to an excessive amount, pressure rises, the eye becomes unduly hard, and the functions of the eye suffer. This is what happens in glaucoma, and this condition of increased intra-ocular pressure is to be borne in mind as the central fact of glaucoma. Glaucoma appears in many forms and under many conditions, but the fact of increased pressure or hardness of the eyeball is common to them all.

3. Another anatomical point to which I wish to draw your special attention is the part of the eye which is known as the optic nerve entrance, or, more correctly, the optic nerve exit. This is situated two millimetres to the nasal side of the posterior pole of the eye, and its importance lies in the facts: (a) That this is the weakest part of the scleral envelope, and (b) that through this part the fibres of the optic nerve—the conductors of visual impressions to the brain—have to pass in leaving the eye. I shall show later on how it is the action of the excessive pressure inside the eye on this part of the ocular structure which causes failure of vision in glaucoma.

Let us now stop for a moment to consider how our present conception of glaucoma arose. You will find that ophthalmology is full of curious words, the names which were applied to diseases in a far distant time before the nature of the disease was at all understood, and "glaucoma" is one of these strange words. It is derived from a Greek word which means sea-green, and which applies to only one feature, and that not a very constant feature of the disease, namely, the appearance of a greenish color in the pupil.

In the days of Hippocrates, the ancient Greek physician, who practised in the fifth century before the Christian era, there was a group of diseases, indistinguishable from each other, in which blindness, more or less complete, was associated with little or nothing in the way of outward signs. To these the name glaucoma was given. We know now that this included, besides true glaucoma, a wide variety of conditions: cataract, detachment of the retina, optic nerve atrophy, and so on. At a later period, still in ancient times, it became possible to distinguish between certain diseases of this group which could be cured by removal of some opacity from behind the pupil, and those which could not be so treated, and the term glaucoma became restricted to the latter. Down to the end of the eighteenth century, while the term was becoming restricted in its application, there was the greatest confusion as to the nature of the disease, and the seat of the trouble was variously attributed to the vitreous humour, the retina, the choroid and the optic nerve.

The first step in establishing the modern conception of glaucoma was made by Dr. Wm. MacKenzie, of Glasgow, who in 1830 gave a good clinical description of the disease, showed that an important feature of it was the hardening of the eyeball, and suggested and carried out such measures as puncture of the coats of the eye to relieve the excessive intra-ocular pressure.

Up to this time the anatomical peculiarities of the glaucomatous eye had never been described, and no one had ever seen the interior of the living glaucomatous eye. The introduction of Helmholtz's ophthalmoscope in 1851 gave a new impetus to ophthalmological research in many directions, and it was not long before our knowledge of this disease was lifted on to a much higher plane by von Graefe's discovery of the "cupping" of the optic disc, and of the pulsation of the arteries of the retina, while he advanced the treatment by the use of drugs to contract the pupil and the operation of iridectomy to restore the disturbed balance of the ocular lymph circulation. Since von Graefe's time ophthalmologists have been briefly engaged in differentiating the clinical type of

glaucoma, in completing the detailed description of its pathological anatomy, and in devising new methods, chiefly operative, for its treatment. There have also been many theories advanced to account for its origin, but it cannot be said that the satisfactory explanation has yet been found, and I shall not trouble you with this aspect of the subject.

What you would no doubt wish to know is: What is a case of glaucoma like, and how are we to recognize it?

For the sake of completeness, I shall refer to all the known varieties of glaucoma, but for reasons which I shall give, some of these will only need to be glanced at.

In the first place we have the two main types:

1. Primary glaucoma.
2. Secondary glaucoma.

In primary glaucoma the disease arises without any known disease or injury having existed to cause its onset, while secondary glaucoma always results from an injury or some pre-existing eye disease, namely, a wound with metal, a dislocated lens, iritis or some such cause. These eyes are practically always painful, or the cause of pain of a neuralgic nature in the neighborhood of the orbit, and they are irritable, inflamed and very hard to the touch.

Secondary glaucoma we can put on one side for the purpose of this lecture, for this condition is very unlikely to present itself to you, and, if it did, the eye would be so obviously diseased that you would pass the case on to an ophthalmic surgeon.

Primary glaucoma again divides itself naturally into two types:

(a) Acute congestive glaucoma.
(b) Simple or chronic glaucoma.

There are also cases classified as sub-acute, but for our purpose they belong to the acute congestive type.

An attack of acute glaucoma comes on, as a rule, with great suddenness. The eye is intensely red, the pupil is dilated, the anterior chamber is shallow, the cornea is grey or steamy, and the tension of the eye, when felt with the fingers, is extremely hard. But the patient is more conscious of the severe neuralgic pain which, commencing in the eye, spreads to the eyebrow, the temple, the face and the teeth, as well as throughout the head. Often the patient becomes sick and vomits, and the symptoms of gastric disturbance are so overpowering that the inflamed condition of the eye seems of quite secondary significance, and the medical attendant is mislead to the point of missing the diagnosis. The symptoms of the attack, even to the sickness and vomiting, are all caused by the great rise of intra-ocular pressure, and so great is the damage done to the delicate structures of the eye that vision is, at least temporarily, abolished, and if the pressure is not relieved within a day or two vision may be irreparably lost.

The main difference between the acute and sub-acute congestive cases is one of degree, the sub-acute attacks being less sudden in onset, less severe and more likely to recur at short intervals, each attack leaving the vision somewhat worse than before. It will be evident that patients suffering from either of these two varieties of glaucoma will find their way direct to the physician or ophthalmic surgeon, and it is unlikely that you will be called upon to recognize them. There is, however, one aspect of these cases which is of the greatest importance to you. In many of them there occurs between the actual attacks, or before an acute attack has ever occurred, symptoms which are referred to as the prodromata of the disease. When these occur the patient may be conscious of a little dull ocular pain, vision is temporarily blurred, and the patient, on looking at a light, e. g., a street lamp, sees it surrounded by a halo of rainbow colors. By the time the patient comes under observation there may be no visible evidence of disease, but a story like this is absolutely characteristic, and points definitely to the existence of glaucoma.

This brings me to the most important aspect of our subject, viz., that of chronic, simple, glaucoma. This disease in by far the majority of cases comes on insidiously, causes at first only vague symptoms, and may be well established before the patient makes any complaint, and even when well advanced may present no outward signs by which it can be recognized.

As in the other forms of glaucoma, the central and all-important fact is the rise of intra-ocular pressure, but the pressure is not strikingly high, and

may be difficult to detect, while, acting over a longer period of time, it leads to progressive loss of function and pathological changes which are often difficult to detect in their earliest stages. I shall mention first the objective changes, and then deal with the symptoms and functional derangements. One of the external evidences of simple glaucoma, when present, can be seen and recognized at a glance. This is shallowness of the anterior chamber combined with moderate dilatation and sluggishness of the pupil. It is difficult to show in a picture, but if you have once seen a case of such shallowness of the anterior chamber, the iris being pushed forward close to the cornea, you are not likely to have any difficulty in recognizing it. If this is present it will usually be found that the hardness of the eyeball is quite recognizably present on comparing the affected with the unaffected eye. If now you examine with your ophthalmoscope you will almost certainly find the characteristic "cupping of the optic disc." I have already mentioned that the optic nerve entrance is the weakest part of the supporting envelope of the eye, and fairly early in the disease the continuous high pressure thrusts back the lamina cribosa, distorting and pressing on the fibres coming from the retina to the optic nerve, and in this way impeding the function of the nerve and leading to the characteristic disturbances of vision and the field of vision. At the same time, if you are sufficiently expert with your ophthalmoscope, you may see the pulsation of the arteries of the retina. Pulsation of the retinal veins is of no significance, for it is present in the majority of normal eyes, but obvious pulsation of the arteries, though seldom seen, is almost a sure sign of chronic glaucoma.

Coming now to the symptoms of the disease, there is practically no form of visual defect which may not be complained of, and this can be understood from the fact that ultimately there is a reduction of central visual acuity, i. e., V. A. as tested with test types, while in the earlier stages the pressure on the nerve fibres, where they cross the edge of the optic nerve cup, produces localized defects of various shapes in the field of vision, as well as lowering of light sense. Moreover, pressure on certain nerve causes interference with the function of accommodation.

One of the earliest symptoms of the disease is a tendency to transient failure of vision—not a failure amounting to blindness, but merely a blurring, as, for example, of small print, after the patient has been reading for a short time. This may be due to temporary rise of intra-ocular pressure, or to fatigue of the central region of the retina, or to failure of accommodation. It often leads the patient to suspect that his reading glasses are not strong enough, and may cause him to seek a change of glasses at frequent intervals. It is of the utmost importance that you should bear this symptom in mind, for at this stage the actual visual acuity is not reduced, the defect does not reveal itself in tests of short duration, and one is apt to be quite satisfied with the result of subjective tests and to prescribe glasses without suspecting the existence of disease.

No case should be allowed to escape diagnosis at this stage, for if the examination is carried further it will already be possible to detect the cupping of the optic disc and the characteristic changes outside the center of the field of vision, and if the condition is allowed to drift on, the center of the field of vision will soon be encroached on, and it will be too late to do any good by operation or any other form of treatment.

The rise of intra-ocular pressure is so slight in many of these cases, and its detection is so difficult, even to the fingers of the expert, that I advise you to disregard it as a method of diagnosis, and to concentrate your attention on the vision, the field of vision, and the ophthalmoscope picture.

What, then, are the characteristic changes in the field of vision, and how are they to be detected?

As a rule it is only in the more advanced stages of the disease that gross contraction of the periphery of the field of vision is observed. Of much greater importance is it to be able to detect the defects in the central and paracentral parts of the field. These defects, briefly, take the form of (1) enlargements or extension of the blind spot, and (2) scotomata or gaps in the field of vision. The most characteristic of all is the so-called arcuate scotoma which commences at, or includes, the

blind spot, and sweeps round the fixation point, either above or below, or in the form of a ring completely enclosing the fixation point. Since the blind spot lies between the 15° and 25° circles, this defect most frequently shows itself in this region, and this is the principle underlying Priestly Smith's "Scotometer," in which a small white spot is rotated at distances of 5°, 10°, 15° and 20° from the central fixation point. Broadly speaking, if chronic glaucoma is present, there will be some area in which this spot will disappear, indicating the presence of the characteristic scotoma.

Now, if you note the favorite situations for this scotoma you will understand certain complaints made by the patient, and certain responses to your tests, which should lead to the suspicion of the presence of this disease.

One patient of mine complained that when he was winding up his clock in the usual fashion, he did not see the figure 12 on the dial, and this led to the discovery that he had an arcuate scotoma which encroached very closely on the fixation point from above. In other cases suspicion was first aroused by the fact that while the patient had quite good central vision, she read slowly, the reason being that the field defect encroached on the central area from the right side, so that the word following the one read was always indistinct or absent, and the eye did not pass easily from one word to the other.

Sometimes in reading the distance test types the patient will volunteer the statement that the letters down one side of the board stand out more clearly than the rest of the letters, and this should at once arouse suspicion of some defect in the field of vision and lead to careful and extended examination. It cannot be too often or too firmly impressed on you that this dreaded disease, chronic glaucoma, may exist for quite a long time, long enough to do irreparable damage to the eye, without causing any appreciable interference with vision as usually measured with the test types, and we must be on the alert to pick up the least hint of its possible existence, so that no case may be missed. I think it would not be an exaggeration to say that 50 per cent of my cases of chronic glaucoma had been, shortly before I saw them, tested and fitted with glasses, without the condition being diagnosed.

If this lecture is to have any practical value for you it will only be by impressing on you the meaning of this chronic variety of glaucoma, and pointing out how you may recognize it, or, at least, know when there are reasonable grounds for suspecting its presence.

I shall therefore close by summarizing what I have said on this aspect of our subject.

Chronic or simple glaucoma is a primary disease; that is to say, it is not brought about by any known cause, such as injury or preexisting eye disease. It is insidious in its onset, and is not accompanied by redness or pain. The only outward signs, and these are not always present, are shallowness of the anterior chamber and a moderate dilatation of the pupil. The tension of the eye is elevated, but this is not constant, nor is it very pronounced, so it may easily be missed.

In the early stage the symptom which is most suggestive is rapid advance of presbyopia, a too frequent demand for a change of glasses, and a tendency to fatigue, with blurring of vision after short spells of reading. At a slightly later stage, and while visual acuity is still unimpaired, the symptoms are those indicative of defects in the field of vision, especially those islands of blindness which come close to the center of the field. Priestly Smith's method of using the scotometer may detect these defects, while with the perimeter you may measure any gaps which are present in the periphery of the field. If you are skillful with your fingers you may detect hardness of the affected eyeball. Finally, at almost any stage, the ophthalmoscope will reveal the presence of glaucomatous cupping of the optic disc, and remove all uncertainty regarding the diagnosis.

# OPTOMETRIC NOTES

## VARIOUS OCULAR FUNCTIONS

F. McFadden, Opt. D., F. A. A. O.
Athol, Mass.

The following is a quotation taken from an article, "Senses That We Lack" which appeared in the Literary Digest of April 2nd, 1927. This article brought to mind the comments of my own which follow:

Man has five senses, the text-books tell us. But on closer examination we may see that this classification is arbitrary, and that we are really much better provided. Our ears, for instance, not only enable us to hear; they also, by means of the semicircular canals, located according to the three dimensions of space, inform us of our attitudes and bodily movements. Besides form, our eyes show us also colors—which is not done by those of certain other creatures, nocturnal ones, for instance; and our skin is susceptible not only to touch, but also to heat-rays. Then, too—

"Besides this information about the exterior world, our brain receives also internal sensations. Special nerves tell us of muscular contraction, the stretching of tendons and the condition of various organs. Man is thus probably the best furnished of all living beings with useful sensations; he must recognize, however, that some animals possess sense-organs that we lack, and that our organism fails to perceive directly a host of radiations or physical states, whose existence has been shown us by science. Sensitiveness to chemical, tactile, luminous, calorific and vibratory impressions is a primordial property of protoplasm, so we find the simplest creatures, without any differentiated sense-organs at all, reacting to all these impressions. One of the first specialized devices that we meet is the 'statocyst,' which plays the part of a plumb-line, telling the creature of its position with regard to the vertical. In medusae, for example, the arrangement is like a small bell. The 'clapper,' by striking the sensitive hairs that line the cavity in which it hangs, indicate to the animal to which side it is leaning and how it should straighten up. We find statocysts, with a heavy mass hanging freely in a cavity, in worms, mollusks, crustaceans, and fishes; their number and arrangement vary, and as the suspended mass is sensitive to vibration, it is probable that they frequently constitute primitive auditory organs.

The role of the statocyst has been shown by a curious experiment due to Kreide. Replacing with particles of iron the suspended calcareous mass in a crab, he placed a powerful magnet above it. Feeling the particles coming into contact with the upper wall of the statocyst, which would happen normally only when it was upside down, the crab at once turned over and swam belly-up. It thus possest for the moment a 'magnetic sense' that no animal has normally.

Fishes, so badly provided with sight and hearing, have remarkable sense-organs adapted to their particular habitat. Thus many of them are able to appreciate the depth at which they are swimming, owing to a special pressure-gauge connected with the swimming-bladder. A more valuable organ still is the 'lateral line'—a canal that runs beneath the skin, along each side of the body and communicates with the outside world through orifices at several points. In the canal, corresponding to the orifices, are small organs that respond to vibrations. This device makes it possible for the fish to know exactly from what direction water-waves caused by its enemies or its prey are approaching. As the front or rear organs are first affected the fish knows that the wave is coming from before or behind.

If we may judge from the odd character of their sense-organs, insects should have a strange idea of the world—very different from ours. What must they see with their huge eyes, made of compound lenses! Ears are replaced with enigmatic devices, sensitive to vibration, but located in all sorts of queer places, such as the thorax or the leg. Their antennae form very important organs of sense, not only of touch and smell, but also sometimes of hearing, as in the case with the feathery antennae of male mosquitoes. Some male butterflies recognize the odor of the female several miles away. As for ants, their sense of 'contact odor' enables them, according to Forel, to acquire an idea of locality by the juxtaposition of olfactory sensations, as we do it by means of visual images.

There have been described in some animals organs with an eyelike structure, but with a crystalline lens or a cornea opaque to the visible rays of the spectrum. It is supposed that these are 'thermoscopic' organs, sensitive to the infra-red or heat-rays. This is notably the case with the frontal eye of lizards and the 'third eye' of vertebrates, of which man has a rudiment in his pineal gland. At the other end of the spectrum, the ultra-violet rays, which we can not see, very clearly influence protozoans and even some shellfish and insects. As for the X-rays and the Hertzian waves, it would appear that they are not perceived directly by any living creature.

To complete this list, we should also mention the 'sense of moisture,' which, almost non-existent with us, is so fully developed in certain creatures, such as mollusks, frogs and cats that their migrations or movements have always been regarded as barometric, or more properly hygrometric, indications."

Our eyes have more functions than we are wont to realize. We accord them the loose term of "sight," and are in the habit of dropping the subject. Our ears have several factors, some of which are the analysis of aerial vibrations, others of which are concerned with bodily and head positions, poise, and with connecting fibres the audible segment of the brain makes direct connection to ocular orientation in such manner as to so balance vibrations of the drums that the eyes will

point toward the origin of the sound and search out its location.

Specifically, the eyes, through their faculty of convergence, measure distances by a process of triangulation. With the baseline of P.D. known, the angle of convergency of the eyes fixes very accurately the unknown distance to the apex of the triangle, just as a surveyor would do with his transit and many measurements with observations.

By comparative methods of image and memory we also judge distance by retinal magnitudes. But there is very much more to vision than this. The macular area is tightly packed with cones, in comparison with the number of a like area extra-macular. By virtue of this fact we have practical magnification in the central field with a gradual shading off in the field vision due to the gradual separation of the cones as we go outward.

Moreover, color-sense is an attribute of field-vision, and macular vision is not vitally concerned therein. We can and do judge color macularly, but not with the same degree of sensibility as with field-vision.

Motion-vision is a distinct sense. There may be said to be three distinct factors of motion-vision. The movement of an object which is coming toward the eye stimulates an ever increasing number of retinal elements. This is at once indicative of the approach of the eye to an object or the object toward the eye. This crescendo is a particular type of visual sense. There is another sensory state in which the retinal stimulation is a diminuendo, a constantly decreasing number of cones being covered by the moving object. We have borrowed two musical terms since they exactly express our visual sensation. In diminuendo the object is receding. One sensation, that of crescendo, is a warning, calling for caution. Diminuendo is a reverse condition, that of safety. Apply these factors to animals, fishes, birds, or any animate objects having this type of primitive vision and we shall see what it means in factors of search for prey, or flight from danger.

Allied to crescendo and diminuendo is that of a sweep of the retinal image across the field in one direction or another. These retinal stimuli set up appropriate mental reactions connected with pursuit, safety, danger, escape, and their infinite combinations. The retinal stimulations call for appropriate fixations which thereby contribute toward gauging distances and directions of movement. These stimulations have an almost infinite variety of combinations not only in the lives of low and medium orders of creatures, but they are of still greater value to man, who has not only inherited them but has been obliged to give them entirely new interpretations. Man has been compelled to add color vision to these sensations, whereas it is more than likely that most of the lower orders care little about colors in their larger sense, being at best only interested in one or two which may be associated with their particular types of food.

The speed of such retinal stimulations is a large factor in their meaning, but in order to have the faculty of the sense of speed there must at the same time be some standard of time within the organism. What such a time-standard may be we have no method of even guessing. Respiration and circulation would certainly be far too slow as units with which to form judgments upon rapid movements.

The factors of field vision are of most vital interest to optometry at this particular time when the examination of motor car drivers is about to be undertaken. Judgment of distance, of approach, of direction, are very largely in terms of field-vision, little indeed in that of purely macular vision. One who has never possessed macular vision will measure up perfectly in everything but the ability to read letters and numbers. We should at once begin to disabuse ourselves, as optometrists, of the idea that vision is a simple fact by a single organ. It is a compound fact organized and carried out by an organ which may have but one focal system but is capable of using that system in a manner that would be considered marvelous indeed if it were invented by some ingenious Yankee.

## SPECTACLES DEVISED FOR HEMIANOPES

**Herbert S. Marshutz, Opt. D.**
**Los Angeles, Calif.**

The Carl Zeiss works at Jena, Germany have recently devised a spectacle to be used on patients suffering from hemianopsia.

For such afflictions, an enlarged field of view is obtained by the Zeiss Mirror Spectacles. Their object is to replace by reflection at least a part of the missing half of the retinal image in one eye, while the other eye takes care of the other half.

A practical interpretation of this device is as follows: Suppose that the left portion of both retinae is blind, so that the hemianope has no vision on his right side. By reflecting from the nasal or left half of the oculi-dexter into the right side of this eye, the missing section of the visual field is supplied. The left eye takes care of the other half of the field of view.

A single mirror gives an inverted image. There are double-mirrored spectacles available to create an erect image. All mirrors are adjustable.

Although the usage of such a device is limited, its ingenuity commands the attention of all optometrists.

## BIFOCAL DEMONSTRATION

**E. O. Fjelstad, Opt. D.**
**New York, N. Y.**

Recently we came across an article which has helped us to better "get over" the bifocal idea to the person who has never worn them and hesitates to do so on account of a neighbor telling of some annoyance. Following the thought of this article we had ground and placed in trial lens rings Ultex Lenses with plano for distance and additions of +1.00, +1.50, +2.00 and +2.50.

In convincing the patient heretofore that bifocals were necessary we could only show them their distance correction and then place the reading lenses before them. With the Ultex trial lenses the distance correction is placed in the trial frame in back of the addition intended for their use enabling the patient to readily see what the finished lens will be. We have found it a valuable aid and suggest its use to others.

# ABSTRACT DEPARTMENT

**Optometric and ophthalmic Journal articles and reprints to be abstracted should be sent to Dr. G. L. DuPlessis, 209 Yeates Building, Minneapolis, Minnesota. Only papers of interest to optometrists will be reviewed in this department.**

**Objective Dynamic Retinoscopy Combined with Subjective Cross-Cylinder Control. E. LeRoy Ryer and E. E. Hotaling.** The Optical Journal and Review. April 14th, 1927, pp. 21-23.

Ryer and Hotaling combine the Subjective Cross-Cylinder control test with Dynamic Skiametry as follows:

"Ascertain the patient's interpupillary distance when fixating for the working range.

Set the phoro-optometer at that P.D. and the cross-line target, on the reading rod at that working distance.

Direct patient to concentrate on the cross-line target, as a dynamic fixation point, and in the usual manner neutralize the error of each eye, employing no stronger retinoscopic illumination than required to obtain a clearly defined fundus reflex.

Turn in or set in before the left eye the cross-cylinder, always with plus axis at 180.

Turn down both Risley prisms, set, of course, at zero and in position to obtain base-in power.

Turn down the Stevens phorometer with right eye prism base up. Both eyes functioning, this produces two images of the cross-line target, the upper belonging to the left eye and the lower to the right.

Direct patient to look at the upper image (left eye's) with cross-cylinder before it and state whether or not its horizontal and vertical lines are equally black, while you watch with the retinoscope the action of the reflex of the

right eye from before which the cross-cylinder has been removed.

If the lines of this upper image are equal, change cross-cylinder from the left to the right eye and shift the retinoscope to that eye and watch its action while the patient's attention is directed to the lower image (right eye's) with cross-cylinder before it; if the horizontal and vertical lines of the lower image are also equal, leave cross-cylinder before right eye and replace that of left eye so that both are back in place and ask if one target is directly over the other. If the upper be to the right (as it frequently is) exophoria is indicated and base-in prism should be applied, through the Risleys, until vertical alignment, orthophoria, obtains.

This addition of base-in prism may cause the retiniscopic reflex to go markedly "with" and the horizontal lines of each target to stand out blacker, in which event plus spherical power should be added until the shadow is neutralized objectively and the lines of the targets equalized subjectively.

Keep thus alternating the increased plus sphere and the increased base-in prism until binocular balance is secured objectively and subjectively. Keep in mind that the cross-cylinder must be removed temporarily from before the eye that is being viewed with the retinoscope."

T. O. B.

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**D. T. Atkinson, M. D. Management of Cataract in the Young.** Eye, Ear, Nose and Throat Monthly, October, 1926; page 516.

Dr. Atkinson claims that it is doubtful whether cataract in the young is acquired. Nearly all of these lenticular opacities are congenital in origin with the exception of those due to trauma. The cataract is usually overlooked by the parents during the early years of the child's life and when it is noticed it is mistaken for "near sight," and the parents will usually request that glasses be fitted to help this supposed near sighted condition.

It is probable that only a small percentage of cataractous children are born with their lenticular opacities complete, and that a certain amount of "ripening" does actually occur after birth. The opacities may be capsular or nuclear. More frequently, if not traumatic, they are partial, the child reaching the age of school life before the stage of even semi-blindness is reached, it being usually only after the child begins to read that the defect manifests itself.

A rather large percentage of all cataracts in the young are due to trauma, usually resulting from a blow of sufficient force to rupture the capsule of the lens, either anteriorly or posteriorly. There may or may not be a perforation of the cornea or sclera. If the symptoms attending such an injury subside promptly a cataract may result and may not be noticed for months. Following a rupture of the capsule a cataract may develop without any outward symptoms, and the vision be lost for weeks or even months before the cataract is discovered.

The diagnosis of this condition is based upon the same clinical observations that apply to the senile variety. The lens, however, may have a hue different from the mature type and may present a bluish white rather than a grey appearance.

**Treatment of Cataract in the Young**

In cases of juvenile cataract, except the traumatic ones, when little interference with the vision occurs, the child may be fitted with lenses correcting refractive errors and the case may be let alone. If there is much disturbance of vision, operation may have to be done. It is always indicated in from a few weeks to a few months in cases of cataract due to trauma.

The operation for solution of cataract in the young is of course performed by puncturing the lens and admitting the aqueous humor to it. By the macerating influence of the aqueous, the lens tissue rapidly disintegrates and disappears. Before attempting this operation the child's pupil should be widely dilated with atropin. The operation may be done under general or local anesthesia, depending upon circumstances.

J. I. K.

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**Focal Infection of Dental Origin. George W. Mackenzie.** The Eye, Ear, Nose and Throat Monthly. Feb. 1927 (pp. 15-19).

Mackenzie's convictions on the subject of focal infections are as follows:

"I. That a focus of infection in any part of the body will, under certain conditions, give rise to pathologic changes in some other part, often quite distant from the primary focus.

II. That the primary focus is usually a small one such as that found about the apex of a devital tooth. A large area of infection is more prone to spread to the surface with resultant drainage.

III. That the character of the infection at the primary focus is not severe enough to cause a general breaking down of the tissues such as occur in acute abscess formation which tends to rupture and discharge on the surface or break inwardly into one of the vital cavities with resulting complications and sometimes rapid exodus of the patient.

IV. That the circumscribing process which results in limiting the infection to a small focus is due to the natural resistance of the host in walling off the infected area, primarily with lymphocytes.

V. That it is not so much the bacteria themselves as their toxins which give rise to the secondary manifestations, for how could the very rapid improvement which so often follows the removal of the primary focus be otherwise explained. Over night improvement in the case of severe neuritis involving the optic or acoustic nerve is not common. In the case of the sciatic nerve, a complete disappearance of all pain has been observed to occur to within 20 minutes after the removal of an infected tooth. It is this very rapid improvement which I have come to accept as the best proof that the exact focus has been located and removed.

VI. That the pathologic findings in the so-called rheumatic facial paralysis determined by G. Alexander and the findings of Otto Marburg in the spinal ganglion in Herpes Zoster as characteristic of the productive form of inflammation with the typical small round cell infiltration so common to it and the absence of bacteria as further proof that the secondary manifestations are of purely toxic origin.

VII. That a focus of infection in so far as it can produce inflammatory changes of the form referred to above, in any organ of the body, is just as protean in its manifestations as syphilis with which I have sometimes compared it.

VIII. That so many people carry devital teeth and are apparently well is no argument against the principle of focal infection, for in the first place many people are actually sick and unaware of it. Witness the large number of those who are dying of heart affections and who were never conscious of having had a heart, and the number of those who die from other ailments who until the final hours boasted of excellent health. Most of the chronic diseases are insidious in their development and have their origin in a focal infection.

IX. That the determination of the site of the lesion depends upon two factors: First, the specificity of action of the micro-organism in the primary focus, and secondly, some trauma, strain or exposure to cold. The specificity of action of bacteria, particularly of the streptococcus group, referred to by Billings as "elective pathogenic tissue affinity," has been demonstrated repeatedly, and again lately by Price when he succeeded in reproducing experimentally eye inflammation in rabbits, or torticollis and such apparently far-fetched conditions as ovarian cysts. The "elective localization qualities" appear to be sufficient in most cases to explain the large percentage of positive results.

Rosenow in referring to specificity recently says: "The specificity of some of the strains was so marked that intravenous injection in pregnant rabbits was followed by localization and lesions similar in fetuses and mother rabbits."

Billings presents a table of "Elective localization of streptococci" for appendicitis, ulcer of the stomach, cholecystitis, rheumatic fever, etc. It reveals the lowest percentage to be 27 for pericarditis after the injection of streptococci from rheumatism and the highest 90 per cent in the case of erythema nodosum.

That trauma, strains, fatigue and exposure to cold also play a role in localization cannot be gainsaid. For instance, a baseball pitcher in the beginning of the season will occasionally overdo it and develop a neuritis in the branchial plexus of his pitching arm. Again, one who is ripe for it, so to speak, will develop a Bell's palsy on

the side exposed to a draft of air.

Rosenow includes almost every possible factor when he goes so far as to claim that: "Exposure, trauma and fatigue of certain structures, improper food and bad sanitation, lack of sunshine, alcoholism and other excesses and heredity undoubtedly lower the threshold of local or general resistance and thus greatly increase the likelihood of elective localization of bacteria and other infective processes." We are not to infer from this that these several factors, which tend to reduce the resistance of the host, outweighs in importance the 'elective pathogenic tissue affinity' of the invading micro-organism, for otherwise the incidence of selective action would not in the case of experimental animals run too high.

X. That the theory of oxygen tension is tenable in the light of clinical experience and is an important factor in this whole question of focal infection. No more practical demonstration is possible than those I have witnessed, one of which was referred to in my closing discussion to the last paper I was privileged to present before your society. The case was that of a man 45 years of age who had been suffering severely from sciatica for a long time. It was so severe as to cause a pronounced limp when walking. The tonsils had been removed a year or so before. The lower right second bicuspid was devital and was therefore X-rayed. The dentist who made the picture did not believe the findings warranted the belief that it could be the focus of infection causing the neuritis. My associate, Dr. A. V. Mackenzie and I thought otherwise, with the result that it was removed. Twenty minutes after its removal all pain in the leg was gone. An hour or so later pain recurred in the socket from which the tooth had been removed and on returning to the dentist he introduced medicated cotton in order to ease the pain in the jaw. Sixteen hours after the removal of the tooth the sciatica returned almost as bad as before the extraction. At 9:00 A. M. the day following the extraction the dentist removed the cotton and 20 minutes later the sciatica again disappeared. About an hour later the growling pain in the alveolus returned and the dentist washed it out with Dakin solution and introduced another pledget of cotton saturated with something to give relief to the local pains, as he had done the day before. About 16 hours later there was a second recurrence of the sciatica which was relieved when the dentist removed the cotton. This experience was repeated daily for one week before it dawned on us that the cotton plug interfered with the areation of the bottom of the socket which should have been curetted at the time of the extraction but was not. Nothing could have proved more conclusively than this experience that bacteria locked off from air or oxygen pile up a virulency after many hours, which permits them to produce toxins having a selective action for a particular tissue, and that ventilation of the focus causes that virulency to subside.

After the socket was apparently healed the pain in the leg returned but somewhat less severe than it was prior to the extraction. About fifteen weeks later a sequestrum of bone was shed off from the alveolar process and 20 minutes later the sciatica disappeared entirely just as it had done on repeated occasions before when the dentist had removed the cotton pledget from the socket. This supplementary experience merely confirmed those earlier ones following immediately after the extraction. Since that experience eight years ago I have observed many more or less similar ones in which the secondary manifestations have been about the eye and ear.

XII. That experience like the one just cited tends only to strengthen one's conviction that the agent which produced the secondary manifestations must be a toxin and not the bacteria themselves, for how could the elimination of bacteria at the source cause a disappearance of bacteria at the site of the secondary manifestation within so short a time as 20 minutes. Furthermore, in the presence of fairly normal organs of elimination the amount of toxin must be very rapidly reduced if not removed entirely. However, they need not be removed entirely in order to get relief, for we are able to bring about relief in most cases of toxemia by increasing the elimination through purging, diuresis, diaphoresis, etc.

T. O. B.

# THE AMERICAN JOURNAL OF OPTOMETRY

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**DR. JACK I. KURTZ, Room 209 Yeates Building, Minneapolis, Minnesota.**



The Journal has no objection to the reprinting by other magazines of any of its articles, provided such reprints are properly credited to the American Journal of Optometry.


## A. O. A. CONVENTION

Members of the general committee in charge of the arrangements for the 30th Annual Optometric Convention, which will be held in The Willard Hotel, Washington, D. C., June 20-24, 1927, have mapped out an elaborate program for the delegates and visitors who will attend. Aside from the regular business of the Congress, the program includes demonstrations by famous government scientists, visits to points of historic interest in and around the capital city and other features to be later announced.

Among the scientific events planned for the delegates are a lecture at the U. S. Bureau of Standards, lecture at the Army-Navy Medical Museum, lecture at the Hygienic Laboratories of the U. S. Public Health Service, lecture at the Academy of Arts and Sciences and a visit to the Smithsonian Institution to view the American Optometric Association's permanent exhibit there.

## THE BASIC SCIENCE BILL

The practice of healing in Minnesota is now regulated by a Basic Science Board, recently brought into being by legislation enacted at the spring session of the Legislature. The law as it now stands, makes it necessary for all physicians, osteopaths and chiropractors to register with the secretary of this board, and for all applicants who wish to practice any of these professions to take an examination in the basic sciences as they are called before being permitted to go before their respective boards to take the examination which would license them as a physician, an osteopath or as a chiropractor. The Basic Sciences are Anatomy, Physiology, Pathology, Bacteriology and Hygiene.

The osteopathic and chiropractic groups naturally opposed this bit of legislation and while unable to kill it, were able to materially change some of the provisions which would react most unfavorably to them and were also able to secure representation on the board of examiners, the bill as finally passed, having for its examining board, two professors not engaged in the healing arts, and one member from each of the professions named.

Optometry and dentistry along with several other groups of limited healing specialties were exempted in the original draft of the bill, the optometric group, however, believing that the exemption clause was poorly worded, insisted upon its change and after several conferences with the proponents of the bill were successful in having this change made.

Some bitter feeling was stirred up over this matter but now that it all is over we believe those interested will find the new law to work for the benefit of all concerned.

C. C. K.

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## PRICE ADVERTISING

Since we began the investigation of price advertising some very interesting facts have been revealed. Dr. J. Fred Andreae, secretary of the Maryland Board of Examiners, informs us that "since the Board made its ruling in June, 1926, there has been no price advertising of lenses. One of the big department stores complained about this ruling of the Boards to the Better Business Bureau, who in turn took the matter to the Governor. At the conference the Governor said the Better Business Bureau were advocating the wrong cause, as it should be on our side."

Price advertising should be outlawed by each and every optometry State Board in the United States, which has that power conferred upon it by law, because it is wrong from the standpoint of moral and ethical conduct. It is grossly dishonest and deceptive. While we do not believe in the practice, we have no quarrel with the man who advertises glasses at $3.00 and sells them as merchandise only to the public at the advertised price. The case however assumes an entirely different aspect when he attempts to examine eyes and glasses are prescribed according to the findings. Just as the Findings and Diagnosis Can Not Be Made Before the Examination so the Price Can Not Be Determined Before the Examination. Price advertising of this kind is deceptive, and as one of our correspondents states, "you can not quote the price of an article when you do not know its cost, and be honest." Optometrists who are interested in preserving the dignity of the profession in the eyes of the public should urge the members of their State Boards to take some definite action to ban price advertising. New York, Maryland and Oklahoma are the pioneers in this movement—more power to them. Forty-five more states will follow their example. We are anxious to see which state will be next.

J. I. K.

## DEVELOPMENT

Melvil Dewey, founder of the Lake Placid Club in the Adirondack Mountains, and for some years head of the University of the State of New York is quoted by Allison Gray in the April, 1927, issue of the American Magazine, as saying:

"It used to be as simple to get the degree of Doctor of Medicine as it is to get a chauffeur's license nowadays.

"If a young fellow thought he'd like the job, all he had to do was to 'ride with a doctor,' as they called it, for a few months. He would hitch up the doctor's horse, and blanket it when a call was made. Perhaps he was allowed to go in, listen to the account of the patient's symptoms, and hear the doctor's directions. He read—and fell asleep over—the doctor's scant supply of medical books. And finally, after paying some state official a hundred dollars—or ten dollars, if that was all he had—he could hang out his own shingle and practice medicine himself; practice it until he perhaps learned a little by his experimenting!

"This sounds incredible, but it is a fact. It seems more incredible that we had to fight for a better state of things. That is one of the victories which most people have forgotten.

"Then there were the dentists. When I raised the standards for admission to that profession, a delegation of dental practitioners came to me to protest.

"I said to them, 'Gentlemen, you are going to have a chance, here and now, to decide whether you will be simply a lot of sublimated blacksmiths, or members of a scientific profession!'

"'I said that, but it wasn't true,' laughed Dewey. 'They didn't have a chance to decide! The decision already had been made—by me. In spite of themselves, their profession was put on a scientific basis.'"

All of which makes us comment, that inasmuch as this man Dewey is still living and that all of this professional development took place in the admittedly progressive state of New York, within the short span of one man's lifetime, that we should not grow discouraged at the—at times discouragingly slow progress the profession of optometry is making. Despite all that is said to the contrary, we do make progress every year, and when one carefully reviews the past the progress is positively astounding.

# REPORTS AND ANNOUNCEMENTS OF SOCIETIES

## STATE EDITORS

E. B. ALEXANDER, Oklahoma
A. S. ANDERSON, North Dakota
J. F. ANDREAE, Maryland
L. P. FOLSOM, Vermont
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**Reports of Society Proceedings in Delaware should be sent to Dr. M. Burton Meyer, 101 West Eighth St., Wilmington; in Iowa to Dr. D. A. Kinney, Charles City; in Maryland to Dr. J. F. Andreae, Baltimore; in Minnesota to Dr. J. A. Large, Winona; in Nebraska to Dr. C. A. Perrigo, Freemont; in North Dakota to Dr. A. S. Anderson, Williston; in Oklahoma to Dr. E. B. Alexander, Duncan, and in Vermont to Dr. L. P. Folsom, So. Royalton.**

### OKLAHOMA'S EDUCATIONAL CLINIC

Oklahoma is very fortunate from an Optometric standpoint, in many ways. For a number of years, we have had the privilege of attending two educational clinics each year, put on by the State Association.

In January of this year, we had a wonderful clinic in Tulsa, with Dr. Peckham, as chief clinician. Anyone who has heard him, will appreciate what this grand old man is doing for Optometry and the Optometrist.

April 18-19-20 last, we had the pleasure of hearing that prince of Optometry, Dr. W. B. Needles. As our chief clinician, he gave us four wonderful instructive lectures as follows: "Muscular Imbalances," "Successful Optometry," perhaps the most valuable lecture ever given the Optometrist of this state. "Modern Optometrist Procedure," using clinic patients in the demonstration of examination technique. Also "Diseases due to Over-accommodation."

The evening of the second day was devoted to two hours of questions, answers, and general round table discussion, where many Optometric problems were solved. Dr. Needles also spoke before the Co-operative Civic Club of Oklahoma City, at a noon luncheon, Wednesday, April 20th.

A special feature of which much favorable comment was heard, was a two hour lecture, "The Relationship of Dentistry and Optometry," by Dr. L. G. Mitchell of Oklahoma City.

Dr. Roy S. Dean of Omaha gave a very enlightening lecture on "Illumination," which was very much enjoyed by those present.

Another important and valuable feature was our own Dr. E. B. Alexander's lecture, wherein, he gave his experience with visual surveys.

We are indebted to both the American Optical Co. and the Riggs Optical Co. of Oklahoma City. Each furnished the Association with a complete equipped refracting unit, for use in the clinic.

It is hard to imagine a more successful line up of lectures and subjects, than those we had for our 22nd Annual Convention and Clinic.

Dr. W. S. Farmer,
Chairman.

### BROCKTON OPTOMETRISTS MEET

The Brockton Optometrists met in the office of F. H. Worthing, 142 Main St., Thursday evening, April 7th, and heard a lecture given by Dr. F. McFadden of Athol, on the subject, "Suspenopsia."

The meeting was called to order by Dr. H. J. Webb of this city, with the following optometrists present: Drs. F. H. Worthing, C. L. Leach, J. J. Kelleher, J. A. Murray, W. Work, W. E. Bryant and E. C. DeLorey. Dr. McFadden presented his subject-matter in an interesting manner, pleasing his audience who gave him close attention.

Herbert J. Webb, Opt. D.

### SPRINGFIELD ZONE MEETS

The Springfield Zone of the Massachusetts Society of Optometrists held an educational meeting last night at the offices of J. W. S. Hartshorn, 1301 Main St., this city.

Dr. Fay McFadden, of Athol, Mass., gave us a most entertaining and comprehensive lecture on "Suspenopsia," dealing with its detection and correction. A large number turned out to hear him, and all felt well repaid for their time spent.

C. F. Ryan, Opt. D.,
Zone Chairman.

### VERMONT OPTOMETRIC CONVENTION

Annual convention at Hotel Barre, Barre, May 17th and 18th, with what is planned to be a program of unusual interest and value. Optometry is "looking up" in Vermont. Every little while we read first in "this" journal and then in "that" one that "Optometry needs to put its own house in order" and all kinds of suggestions are offered for the relief of "What is wrong with Optometry."

The Vermont Association working together with the Optometry Board has obtained many amendments to our optometry law so that we feel we now have a law which will "hold water" and has plenty of "teeth" in it to do the work. These were covered by Senate Bill No. 78 enacted at the last legislative session. The board is now required to revoke the license of any optometrist engaged in "gross unethical or unprofessional conduct" as well as those who peddle or canvass from house to house or from town to town.

A complete copy of the new law together with the rules and regulations of the Board will be sent all registered persons as soon as issued. Read and thoroughly digest its contents when you receive it.

Dr. L. P. Folsom, Secretary.

### CONNECTICUT ASSOCIATION MEETING

The second quarterly meeting of the Connecticut Optometric Society was held re-

cently at Hotel Stratfield in Bridgeport.

Dr. E. Roland Crouft, president of the associtaion, was chosen to represent the organization at the A. O. A. convention. Dr. Crouft was also recommended to the governor for consideration in filling the vacancy on the state board caused by the resignation of Dr. W. J. Hand.

Dr. Ralph Dublin of Rochester, New York, an authority on industrial survey work, delivered a very interesting talk on Eyesight Survey and Service, which was of great interest to the members.

## OFFICIAL PROGRAM—30TH ANNUAL CONGRESS, AMERICAN OPTOMETRIC ASSOCIATION

Willard Hotel, Washington, D. C.
June 20-24, 1927.

**Friday, June 17, 1927**

Meeting of the trustees of the A. O. A. (Private.)

**Saturday, June 18, 1927**

9:00 A. M. to 10 P. M.—Reception of delegates. Registration.

**Sunday, June 18, 1927**

9 A. M. to 10 P. M.—Reception of delegates. Registration. State societies.

**Monday, June 20, 1927**

9 A. M. to 10 P. M.—Reception of delegates. Registration.
9 A. M. to 11:30 A. M.—State societies. Southeastern Congress.
12 M.—Visit to White House.
1:30 P. M.—Visit to Arlington.
3 P. M.—Visit to Smithsonian Exhibit.

**Tuesday, June 21, 1927**

9 A. M. to 12 M.—Annual meeting.
10:30 A. M. to 5 P. M.—Ladies at Country Club.
12 M. to 2 P. M.—Luncheon recess.
2 P. M. to 6 P. M.—Annual meeting.
6 P. M. to 8 P. M.—Dinner recess.
8 P. M.—Annual meeting.

**Wednesday, June 22, 1927**

9 A. M. to 11 A. M.—Lectures by A. O. A. lecturers.
11 A. M. to 2 P. M.—Exhibits.
2 P. M. to 4 P. M.—Lectures at Hygienic Laboratory and Academy of Arts and Science.
4 P. M. to 6 P. M.—Exhibits.
8 P. M.—Lecture at George Washington University.

**Thursday, June 23, 1927**

8:30 A. M. to 10:30 A. M.—Lecture Medical Museum.
11 A. M. to 1:30 P. M.—Exhibits.
12 M. to 1:30 P. M.—Lunch at the Willard Hotel. (Subscription.)
2 P. M.—Leave for Mt. Vernon, returning about 6 P. M.
8 P. M.—Reserved for adjourned annual meeting.
8 P. M.—Fraternity night.
8 P. M.—State societies.

**Friday, June 24, 1927**

8:30 A. M. to 10 A. M.—Exhibits.
10 A. M. to 12 M.—Lectures by A. O. A. lecturers.
12 M. to 1:30 P. M.—Exhibits.
2 P. M.—Lecture at Bureau of Standards.
8 P. M.—Annual banquet.

The registration fee will be $10.00 per couple.

## MAINE ASSOCIATION MEETING

The next meeting of the Maine Association of Optometrists will be held at Lewiston, at the DeWitt Hotel, on Wednesday, May 18th, at 1 P. M.

A wonderful program has been arranged. Drs. George McL. Presson will give a lecture on Blood Pressure; Donald Wight will give a ten minute talk on Dynamic Skiametry; Del Plaisted will give a talk on Astigmatism; Bill Leavitt, a ten minute talk on Optical Publicity. The most important debate of the year will follow, on the subject, "The Value of Peckham's Method of Muscle Innervation." The "Pros"—Arthur Corriveau and Joe Brown. The "Cons"—Harry Covelle and Paul Carey. Time limit for each debater, ten minutes.

A fine banquet will be held at the hotel followed by an evening of strictly fun with vocal and instrumental solos.

Howard L. Bryant, Opt. D.

## MINNESOTA ASSOCIATION

The Executive Committee of the State Association at a meeting held April 29, decided to conduct a postgraduate course in optometry some time during the latter part of June. Plans are now being laid to have the course given at the University of Minnesota.

Dr. Jos. L. Frank, President, appointed a committee to assist in all the Association activities during the year. It is to be known as the Committee of Fifty. Dr. Frank reported that all the members of the Committee of Fifty replied to his letter accepting the appointment and promised to co-operate in every way possible so that something may be accomplished for optometry this year.

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